

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 33-35 and 27-40 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In regards to claim 33, the claim has been amended to require that during the preliminary vulcanization step, the tire be closed into a hermetically sealed cavity “without a vulcanization mould.” Applicant does not have support for this newly-added negative limitation. Page 11 of the present specification describes the hermetically sealed cavity. The specification is silent as to both the presence and omission of a vulcanization mold in the sealed cavity. There is nothing in the specification of the present Application which would lead a skilled artisan to appreciate that a vulcanization mold is omitted from the hermetically sealed cavity as a necessary feature of the invention of the present application. 2173.05(i) of the MPEP states that “The mere absence of a positive recitation is not basis for an exclusion.” On page 6 of the remarks filed 10/4/2011, Applicant asserts that support for the negative limitation comes from

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Figure 1, in which a vulcanizing mold is not depicted. The examiner respectfully disagrees that this supports the negative limitation. The figure cited by Applicant is merely a highly schematic representation of the apparatus. In patent applications, features of an invention are very frequently omitted from the drawings in order to declutter and simplify the illustration. Figures are understood as not necessarily being all-inclusive and indicative of every possible feature or element. The absence of molds in the figures is insufficient as a disclosure of the omission of vulcanization as a necessary feature of the invention of the present application. Claims 34, 35, and 37-40 are rejected for being dependent on claim 33.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 33-35 and 37-40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 33 has been amended to require that the hermetically sealed cavity exclude a vulcanization mold. However, the claims also require that in the hermetically sealed cavity, the inner tire is pressed against the toroidal support and vulcanized. It therefore appears that the toroidal support is acting as a rigid molding surface for the interior of the green tire. If the toroidal support weren't present, the tire would have a different shape after the initial curing step. The tire is therefore inherently being molded as it is vulcanized in the preliminary vulcanization step of the claim. Claim 33 appears to

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directly contradict itself because it requires the exclusion of a vulcanization mold within the sealed cavity while simultaneously requiring that the tire be vulcanized and molded within the cavity. For purposes of examination, the examiner has assumed that Applicant intended to require that the hermetically sealed cavity be without a tread mold. Claims 34, 35, and 37-40 are rejected for being dependent on claim 33.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 33, 34, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caretta (Pre-Grant Publication 2002/0125615) in view of Blickwedel

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(WO 00/03867), Hopkinson (DE 355909) and Midgley (USP 1394928). Note that USP 6923879 is an English language equivalent of the WO document and used below to make the following rejections.

In regards to claim 33, Caretta discloses a process for creating pneumatic tires (Abstract) in which a liner is created and cured on a toroidal support which matches the shape of the inner surface of a tire ([0083]) and then the remainder of a tire is built on the liner layer and cured in a mold which conforms in shape to the final shape of the tire ([0091]). Caretta does not disclose precuring both a liner and a carcass portion of the tire in a hermetically sealed chamber prior to the tire vulcanization/completion step.

Blickwedel discloses that by performing a precure operation on the carcass layer in addition to a liner layer (Column 6, lines 67), the carcass layer including horn profiles (Abstract), several advantages can be achieved, such as the ability to create a variety of tires from a single production line (Column 6, lines 35-38) and improved dimensions in the final tire (Column 4, lines 52-56). One of ordinary skill would therefore find it obvious to pre-cure a carcass layer of the tire in addition to the liner in the method of Caretta for the benefit of improving the dimensions of the final tire or increasing the adaptability of the process to different products (as disclosed by Blickwedel). Caretta discloses curing the liner layer of a tire in open air by applying heat through the tire support ([0084]). Caretta does not disclose how a carcass layer could be pre-cured. Caretta discloses that a variety of exemplary curing methods can be used to vulcanize the liner layer

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([0084]), suggesting to one of ordinary skill in the art that any well known method for curing a pre-tire structure would also be suitable.

Alternatively, Hopkinson discloses that in addition to curing just a liner layer of a tire, it is functionally equivalent to use a heated metallic support for the tire to perform an initial vulcanization of the interior of the tire at any intermediate stage during the manufacture of the green tire before introducing the completed tire into a vulcanization mold and introducing a working fluid into a space between the metal support and the interior of the tire (last two paragraphs of the reference). Therefore, one of ordinary skill in the art at the time of the invention would have found it obvious to vulcanize the interior of the tire of Caretta after a liner layer and carcass layer were assembled together on the support because this is considered functionally equivalent to vulcanizing a liner before building the rest of the tire (as disclosed by Hopkinson).

One of ordinary skill would turn to the disclosure of Midgley, which discloses that a carcass structure can be cured on a heated rigid support (page 2, lines 99-102). Midgley discloses that skilled artisan would consider it to be functionally equivalent to either heat the carcass structure in open air or under an applied fluid pressure (Page 2, lines 15-35). Midgley further discloses that a fluid pressure pressing the carcass against the rigid support can be supplied through a hermetically sealed container (Page 2, lines 35-47 and Page 4, lines 9-12). Midgley discloses that compressing the carcass against the rigid support during pre-curing has the additional benefit of creating a more uniform product (Page 1, lines 79-84 and 94-101) (Page 2, line 129 though Page 3, line 2). Therefore, one of ordinary skill in the art at the time of the invention would have found it

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obvious to perform the carcass and liner pre-curing on the heated supported (as required by the previous combination) in a hermetically sealed pressure vessel because this is functionally equivalent to curing in an open air environment (as disclosed by Midgley). One of ordinary skill would have been further motivated to utilize a hermetically sealed container for the additional benefit of ensuring the uniformity of the product (as disclosed by Midgley).

Although Midgley discloses an embodiment in which the preliminary vulcanization step occurs with the tires placed in a hermetically sealed container in which the final vulcanization molds are included, Midgley also discloses numerous embodiments in which the tires are cured in a device apart from the final vulcanization molds (Figures 3 and 4)(Page 2, lines 38-44). It is therefore the examiner's position that based on Midgley's disclosure of using a pressurized atmosphere to perform the preliminary vulcanization operation, as well as Midgley's numerous examples of performing the preliminary vulcanization operation away from the final vulcanizing molds, a skilled artisan would find it obvious to use a pressure vessel apart from the final vulcanizing molds to perform the preliminary vulcanization operation of the combination of references. In addition, the examiner wishes to point out that in the primary reference to Caretta, the liner layer is expressly disclosed as being cured at atmospheric conditions away from the vulcanizing molds ([0021]). One applying Midgley's teachings of curing in a pressurized environment (and that it is functionally equivalent to cure in either the open atmosphere or a pressurized environment) to the process of Caretta would therefore find it obvious to use a pressurized vessel which is

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separate from the vulcanization molds to perform the preliminary curing operation.

Finally, the examiner wishes to point out that Hopkinson discloses that the vulcanization can occur at any intermediate stage of the green tire-building process. If the preliminary vulcanization were performed before the green tire was completely assembled, then the preliminary vulcanization would not occur within the final vulcanization mold.

In regards to claim 34, Blickwedel further discloses that the belt structure be pre-cured (Column 3, line 46).

In regards to claim 37, Caretta further discloses heating with electrical heaters, which would generate heat at the surface of the rigid support ([0084]).

Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over the previous combination of Caretta (Pre-Grant Publication 2002/0125615) in view of Blickwedel (WO 00/03867), Hopkinson (DE 355909) and Midgley (USP 1394928) as applied to claim 35 above, and further in view of Brewer (USP 4620561).

In regards to claim 35, Midgley is silent as to in what order heat and pressure are applied to the carcass during the curing operation, suggesting to one of ordinary skill in the art that any well known method of curing a portion of a tire under pressure would be suitable.

Brewer discloses that it is well known to pressurize a tire laminate prior to applying heat to the laminate (Column 1, lines 49-55). Therefore, one of ordinary skill in the art at the time of the invention would have found it obvious to pressurize the laminate of the previous combination before heating it because this is a well known order to perform the pressurized curing step required by the previous combination.

Claims 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over the previous combination of Caretta (Pre-Grant Publication 2002/0125615) in view of Blickwedel (WO 00/03867), Hopkinson (DE 355909) and Midgley (USP 1394928) as applied to claim 35 above, and further in view of Oku (Pre-Grant Publication 2002/0121324) or Dailliez (USP 5622669).

In regards to claim 37, Caretta further discloses that the toroidal support can be heated by a variety of exemplary methods ([0084]), suggesting to one of ordinary skill in the art that any well known method of providing a curing energy to a tire component would be suitable.

Oku suggests that a precuring operation can be performed by providing energy in the form of magnetic induction ([0031]). Dailliez also discloses that it is known to provide a curing energy through magnetic induction (Column 3, line 7). One of ordinary skill in the art would therefore be motivated to heat the tire component on the toroidal support of the above combination with magnetic induction because this is a well known method of providing a curing energy for a tire component (as disclosed by Oku and Dailliez).

In regards to claim 38, one of ordinary skill in the art would find it obvious to use magnetic induction for the reasoning provided for claim 37. It is the examiner's position that because the specification of the present application states that the presence of a magnetic field is the only thing necessary for heat generation within the tire, the use of a magnetic field for the reasoning presented above would be expected to have the tire-heating affect required by the claim.

In regards to claim 39, one of ordinary skill would appreciate that the heating time required is dependent on the type of tire, its size, shape and composition. One of ordinary skill would therefore use routine experimentation to determine the optimum curing conditions in order to adapt the vulcanization step to the specific tire being created.

In regards to claim 40, one of ordinary skill would appreciate that the curing pressure is dependent on the type of tires, its size, shape, and composition. One of ordinary skill would therefore use routine experimentation to determine the optimum curing conditions in order to adapt the vulcanization step to the specific tire being created.

Claim 65 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caretta (Pre-Grant Publication 2002/0125615) in view of Blickwedel et al. (WO 00/03867),

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Hopkinson (DE 355909), Midgley et al. (USP 1394928) and Dailliez (USP 5622669).

Note that USP 6923879 is an English language equivalent of the WO document and used below to make the following rejections.

In regards to claim 65, Caretta discloses a process for creating pneumatic tires (Abstract) in which a liner is created and cured on a toroidal support which matches the shape of the inner surface of a tire ([0083]) and then the remainder of a tire is built on the liner layer and cured in a mold which conforms in shape to the final shape of the tire ([0091]). Caretta does not disclose precuring both a liner and a carcass portion of the tire in a hermetically sealed chamber prior to the tire vulcanization/completion step.

Blickwedel discloses that by performing a precure operation on the carcass layer in addition to a liner layer (Column 6, lines 67), the carcass layer including horn profiles (Abstract), several advantages can be achieved, such as the ability to create a variety of tires from a single production line (Column 6, lines 35-38) and improved dimensions in the final tire (Column 4, lines 52-56). One of ordinary skill would therefore find it obvious to pre-cure a carcass layer of the tire in addition to the liner in the method of Caretta for the benefit of improving the dimensions of the final tire or increasing the adaptability of the process to different products (as disclosed by Blickwedel). Caretta discloses curing the liner layer of a tire in open air by applying heat through the tire support ([0084]). Caretta does not disclose how a carcass layer could be pre-cured. Caretta discloses that a variety of exemplary curing methods can be used to vulcanize the liner layer

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([0084]), suggesting to one of ordinary skill in the art that any well known method for curing a pre-tire structure would also be suitable.

Alternatively, Hopkinson discloses that in addition to curing just a liner layer of a tire, it is functionally equivalent to use a heated metallic support for the tire to perform an initial vulcanization of the interior of the tire at any stage during the manufacture of the green tire before introducing the completed tire into a vulcanization mold and introducing a working fluid into a space between the metal support and the interior of the tire (Last two paragraphs of the reference). Therefore, one of ordinary skill in the art at the time of the invention would have found it obvious to vulcanize the interior of the tire of Caretta after a liner layer and carcass layer are assembled together on the support because this is considered functionally equivalent to vulcanizing a liner before building the rest of the tire (as disclosed by Hopkinson).

One of ordinary skill would turn to the disclosure of Midgley, which discloses that a carcass structure can be cured on a heated rigid support (page 2, lines 99-102). Midgley discloses that skilled artisan would consider it to be functionally equivalent to either heat the carcass structure in open air or under an applied fluid pressure (Page 2, lines 15-35). Midgley further discloses that a fluid pressure pressing the carcass against the rigid support can be supplied through a hermetically sealed container (Page 2, lines 35-47 and Page 4, lines 9-12). Midgley discloses that compressing the carcass against the rigid support during pre-curing has the additional benefit of creating a more uniform product (Page 1, lines 79-84 and 94-101) (Page 2, line 129 through Page 3, line 2). Therefore, one of ordinary skill in the art at the time of the invention would have found it

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obvious to perform the carcass and liner pre-curing on the heated supported (as required by the previous combination) in a hermetically sealed pressure vessel because this is functionally equivalent to curing in an open air environment (as disclosed by Midgley). One of ordinary skill would have been further motivated to utilize a hermetically sealed container for the additional benefit of ensuring the uniformity of the product (as disclosed by Midgley). Because the combination of references is directed to using a pressure vessel to apply a fluid pressure to the casing while supplying vulcanizing heat, a skilled artisan would find it obvious to discontinue the heat-application step before removing the green tire from the pressurized environment. The examiner notes that the exact duration of the heating and pressurizing step is a matter of optimization that a skilled artisan would achieve through routine experimentation in order to accommodate tires and tire cores of a specific size, shape, and type of material.

Because a skilled artisan would find it obvious from the combination of references to perform a preliminary cure of the liner and carcass together at an intermediate stage of the tire-building process, and also because the combination of references depends on heating the core to supply heat to the interior of the tire, it is the examiner's position that the core will inherently retain heat after the preliminary vulcanization operation (because all materials have at least some heat capacity) and will therefore also continue to transfer heat to the green tire as the remainder of the tire is built on the core.

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In any event, Dailliez discloses that the efficiency of a process can be increased by imparting the necessary vulcanizing energy to a molding surface at a heating station (Column 2, lines 27-43) and then allowing the vulcanization to be completed as heat stored due to the heat capacity of the mold is transferred to the green tire after it has been removed from the heating station (Column 1, lines 13-25). Therefore, in order to increase the efficiency of the prevulcanization step, a skilled artisan at the time of the invention applying the teachings of Dailliez to the combination of references would have found it obvious to discontinue the supply of heating energy and remove the heated tire core from the heating station before preliminary vulcanization is completed so that the preliminary vulcanization to be finalized due to heat transferred from the core as the core is transported away from the heating station and the remaining tire-building steps are performed. Dailliez is concerned with supplying heat to the tire molding surfaces at a single workstation. A skilled artisan would find it obvious to terminate the supply of heating energy at the workstation before transporting the tire away, otherwise energy would be wasted in the workstation because heating energy would be applied to nothing. One applying the teachings of Dailliez to the combination of references would therefore find it obvious to discontinue the supply of heating energy to the tire support before it is transported out of the pressure vessel in order to avoid the waste of heating energy on an empty pressure vessel.

Response to Arguments

2. Applicant's arguments filed 10/4/2011 have been fully considered but they are not persuasive.

On page 6 of the remarks, Applicant argues that the specification supports the amendments to claim 33. The examiner respectfully disagrees for the reasoning presented above in the rejection under 35 USC 112, first paragraph.

Applicant argues on pages 8-9 of the remarks that Midgley only discloses embodiments in which the preliminary vulcanization occurs when the casing and core are enclosed within compression molds. The examiner respectfully disagrees and notes that Midgley discloses other embodiments in which a preliminary vulcanization steps occurs separately from the mold which is used to perform final vulcanization of a tire (Figures 2 and 3)(Page 2, lines 38-44).

The remainder of Applicant's arguments concern newly-added limitations. These arguments have been fully considered but are moot in view of the new grounds of rejection.

Response to Arguments

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARTIN ROGERS whose telephone number is

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(571)270-7002. The examiner can normally be reached on Monday through Friday, 9:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on 571-272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Martin Rogers/

/Richard Crispino/
Supervisory Patent Examiner, Art Unit 1747